

A NEW BARRED RIVER FROG (MYOBATRACHIDAE: MIXOPHYES)

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ABSTRACT

Mixophyes fleayi sp. nov. has been confused with both *M. balbus* and *M. fasciolatus*, but it is readily separable from these species and the other two members of the genus. The new species is a ground-dweller in montane rainforest from Conondale Range, SE Queensland, to Richmond Range, NE New South Wales. Discovery of *M. fleayi* triggered new examination of the types of *Mixophyes* taxa about which there has been serious confusion. The status of *Hyla fenestrata* de Vis is confirmed as a junior synonym of *M. fasciolatus*, and probable types of *M. balbus* have been located in the Queensland Museum. Also, a lectotype is selected for *M. fasciolatus* Günther, 1864.

INTRODUCTION

Straughan (1968) recognised four species of Barred River Frogs, *Mixophyes* spp., from Australia: *M. balbus*, *M. fasciolatus*, *M. iteratus* and *M. scheyvilli*. In October 1972, we located a population of *Mixophyes* in Cunninghams Gap, SE Queensland. These specimens clearly differed from *M. fasciolatus* and *M. iteratus*, the only species of *Mixophyes* known from there. The frogs keyed to *M. fasciolatus* (following Straughan, *loc. cit.*) but we listed them as *M. balbus* (Ingram and Corben 1975), the species they most closely resembled. When we later collected live *M. balbus* (*sensu stricto*), we realized that our population belonged to a new species. We have examined the holotypes of *Mixophyes balbus* Straughan and *M. iteratus* Straughan, a paratype of *M. fasciolatus scheyvilli* Loveridge, and a syntype of *M. fasciolatus* Günther. The species we describe here is distinct from all of the known species of *Mixophyes*.

The following abbreviations are used: SV, snout-vent length; TL, tibial length; HW, width of head at broadest part; IN, distance between the two external nostrils; EN, distance between the external nostril and anterior border of eye; ED, diameter of eye between anterior and posterior borders. Measurements are in millimetres and ratios are expressed as percentages. Specimens examined are housed in the Queensland Museum (QM), South Australian Museum (SAM), Australian Museum (AM), and the British Museum (Natural History) (BMNH).

Mixophyes fleayi sp. nov.

MATERIAL EXAMINED

HOLOTYPE: Adult female, QM J 26901 Ballanjul Cascades, Lamington National Park, (28°12'S, 153°05'E), SE Queensland. Collected by M. Bishop, 5 April 1976.

PARATYPES: Cunninghams Gap, SEQ (J29930–1, 34101–3, 35461–5); Tambourine Mountain, SEQ (J32059); Canungra Gorge National Park, SEQ (J5198); near summit of Mt Superbus, near Warwick, SEQ (J30545–8); Mt Ballow, SEQ (J26469–70); Taroom Range, NE NSW (J34243–4, AM R123424); Brindle Creek, Wiangaree, NE NSW (J27859); No locality data (SAM R31036).

DIAGNOSIS

M. fleayi (Fig. 1) can be distinguished from *M. scheyvilli* and *M. iteratus* by the amount of webbing on the toes (half-webbed vs fully webbed); from *M. balbus* by the colour pattern on the flanks (prominent black spotting on yellow vs immaculate apricot). Further, *M. fleayi* lacks a distinct, continuous, pale stripe along the upper lip, which is so characteristic of adult *M. fasciolatus* (Fig. 2).

DESCRIPTION OF HOLOTYPE

SV 89, TL 55, TL/SV 62.1, HW 36, HW/SV 40.4, HW/TL 65.1, ED 9.5, ED/HW 26.4, EN 7.0, IN 7.8, EN/IN 89.7. Dorsal aspect of snout blunt, but tapering; in profile, straight, steep, and forward sloping. Short supratympanic fold extending downwards to just past tympanum. Canthus rostralis distinct, concave. Tympanum large and oval-shaped, sloping backwards. Fingers

unwebbed, slightly expanded distally. Length of fingers from shortest to longest 1-2-4-3; large rounded tubercles proximally; large oval-shaped inner palmar tubercle about twice the size of the more elongated outer tubercle. Toes webbed; distal phalanges of the 1st, 2nd, and 5th toes free of web but fringed; distal two phalanges of the third, and distal three phalanges of fourth also have this condition. Length of toes from shortest to longest 1-2-3-5-4; low rounded tubercles proximally, with additional, smaller tubercles more distal on the 3rd, 4th and 5th toes; a large elongated inner metatarsal tubercle. Cloacal opening directed backwards at mid-level of the thighs.

Dorsal ground colour light brown with indistinct marbling; there is also a 'Y' shaped dark brown patch edged black, with the 'base' between the eyes, and 'arms' terminating above the groin. Lateral ground colour grey-brown grading to cream towards the venter; sides overlaid with large black spots. A dark line extends from behind the nares through the eye to behind the tympanum; a

large purplish-black marking below the eye, broadening down to the upper lip; a large similarly coloured marking peaks below and in front of the nares, flares out and terminates on the upper lip. Creamy yellow below; palms and soles black; tips of the fingers and tubercles on the hands creamy yellow. Back of thighs grey-brown with 7-8 black cross-bands.

VARIATION IN THE PARATYPES

There are 23 paratypes, SV 24-82 (mean 64.7), TL 15-52 (mean 42.4), TL/SV 61-69 (mean 65.4); HW 11-34 (mean 27.7), HW/SV 39-47 (mean 43.0), HW/TL 59-72 (mean 65.8), ED 4-10 (mean 7.8), ED/HW 25-33 (mean 28.3), EN 2-7 (mean 5.9), IN 3-8 (mean 6.8), EN/IN 72-98 (mean 85.9).

Pupil vertically oriented. Vocal sacs present in males. Dorsal ground-colouring can be dark brown; the dorsal 'Y' marking often is incomplete. Nuptial pads of males are dark brown; the thumb is thicker at base when compared to the female.

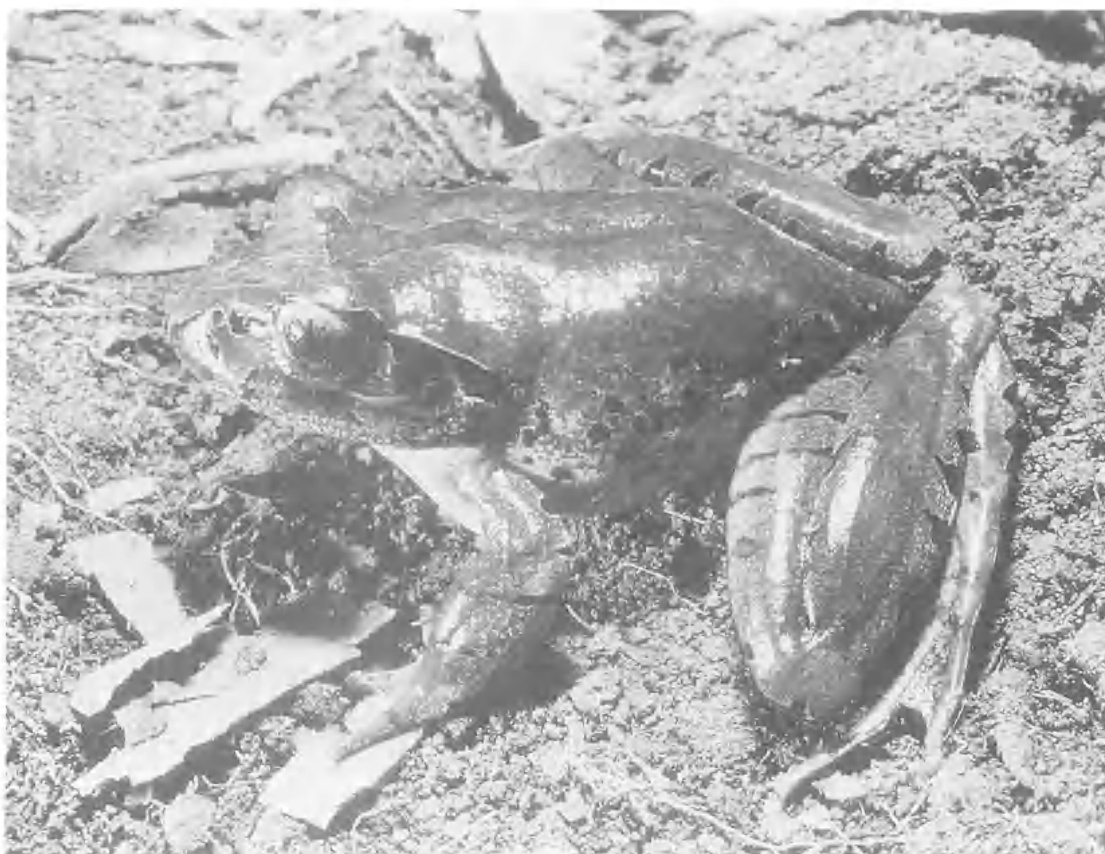


FIG. 1: *Mixophyes fleayi* sp. nov. from Cunninghams Gap, SE Queensland (Owen Kelly).

The throat and the underside of the thighs may be speckled with brown.

ETYMOLOGY

The species is named for the Australian naturalist, David Fleay.

DISTRIBUTION

M. fleayi is restricted to montane rainforests from the Conondale Range, SE Queensland (Ingram 1983), to the Richmond Range, NE New South Wales. *M. fleayi* has been found in sympatry with both *M. fasciolatus* and *M. iteratus*. It is allopatric with *M. balbus* — the dividing line is apparently the Clarence River, which separates the Richmond Range from the Gibraltar Range. The Gibraltar Range is the northernmost locality known for *M. balbus* (C. Corben pers. ob.).

FIELD NOTES

M. fleayi has two distinct calls. One of these is a throaty 'ok-ok-ok-ok-ok-ok', typically given by solitary males calling from under leaf-litter on the

rainforest floor. The other is a long, rasping 'arrrrrrrr', or growling call, given in chorus. Choruses are produced by males calling from exposed rocks in stream beds or from the edges of pools beside the streams. Eggs have been found under a rock about 30 cm from water and attended by an adult frog. The egg mass resembled that of *Pseudophryne*, but the capsules were much larger. Tadpoles resemble those of *M. fasciolatus* but are darker grey and more elongate.

Breeding aggregations are rarely encountered but seem to be associated with late spring thunderstorms on warm nights. More often, individuals are seen hiding under leaf-litter or sitting on paths through the rainforest. At O'Reillys, Lamington Plateau, they may be found with *M. fasciolatus* on the short grass of the picnic grounds but they do not range far from the rainforest.

IDENTIFICATION

The toes are only partly webbed like those of *M. balbus* and *M. fasciolatus*; this distinguishes



FIG. 2: *Mixophyes fasciolatus* from Mt Lamington, SE Queensland (Owen Kelly).

M. fleayi from *M. schevilli* and *M. iteratus*, both of which have fully webbed toes, *M. fleayi* is not known to be sympatric with *M. balbus*, but it is easily distinguished by the presence of black spots on yellow flanks (vs unspotted on apricot in *M. balbus*) and its brighter yellow ventral surface (vs off-white in *M. balbus*). In addition, *M. fleayi* is a more slender, longer-legged species than *M. balbus*, and more closely resembles *M. fasciolatus* in general body form. The most likely confusion is between *M. fleayi* and *M. fasciolatus*, which are widely sympatric. The underparts of *M. fleayi* are yellow (white in *M. fasciolatus*), the pale stripe along the upper lip is interrupted, or non-existent, below the eye (continuous in adult *M. fasciolatus* but may be interrupted in juveniles) and the upper half of the iris is silvery white or even pale blue (black with minute traces of gold in adult *M. fasciolatus* but in juvenile upper half of iris is red). With practice the two are readily separated both by posture and colour. When undisturbed, *M. fleayi* tends to hold the body in a more vertical posture with the longer legs held further away from the more slender body and head than *M. fasciolatus*.

The calls most closely resemble those of *M. balbus* and are very different from the deep, throaty 'groop' of *M. iteratus* and the short 'wark' of *M. fasciolatus* and *M. schevilli*. The 'ok-ok-ok-ok' call resembles in quality the equivalent call of *M. balbus*, but differs in its shorter duration and much slower note repetition rate (cf. Barker and Grigg 1977).

NOMENCLATURE

We have examined the holotypes of *M. balbus* Straughan (1968) and *M. iteratus* Straughan (1968): AM R25922 and 25929 respectively. Neither is conspecific with *M. fleayi*. Straughan (*loc. cit.*) did not examine any type material of *M. fasciolatus* *schevilli* Loveridge (1933) or *M. fasciolatus* Günther (1864). We have examined a paratype of the former (QM J5443), which agrees in details with the holotype. It is a member of Straughan's taxon, *M. schevilli*.

The British Museum (Natural History) lent us one (BMNH 1947.2.19.89) of the two syntypes of *M. fasciolatus* Günther. The specimen is typical of the taxon we call *M. fasciolatus*. The lips are pale and no dark markings intrude; the hindlimbs are short (TL/SV = 53.5, HW/TL = 84.7). We select this specimen to be the lectotype of *Mixophyes fasciolatus* Günther (1864).

There is one other available name within the genus *Mixophyes*: *Hyla fenestrata* de Vis (1885a),

Boulenger (1885) noted that it was a *Mixophyes* and was scathingly critical of de Vis for his inability to tell the difference between the genera. The type material of *Hyla fenestrata* is presumably lost (Covacevich 1971). In the Queensland Museum, where de Vis worked, there are four old specimens (J10418-22) of *M. fasciolatus* from Tweed River — the type locality of *H. fenestrata*. These apparently are not types because none fits the measurements given in the type description. Further, de Vis (1885a, b) did not indicate if he had more than one example of the taxon. For these reasons, and because no date of collection has been recorded for the extant Tweed River specimens, there is no way of knowing whether or not they were seen by de Vis.

Straughan (1968), in his revision of *Mixophyes*, failed to deal with the problem of the availability of the name, *H. fenestrata*. Cogger *et al.* (1983) treated the name as a junior subjective synonym of *M. fasciolatus*. Their reasons for this action were not stated but we agree with the decision. De Vis's description of the characteristics of *H. fenestrata* matches the characteristics of *M. fasciolatus*. He said 'toes less than two thirds webbed', that 'lips pale minutely marbled with black', and that 'flanks white, spotted with black' (in preservative, the yellow would have bleached). Also, these characteristics together are not present in *M. balbus*, *M. iteratus*, *M. schevilli*, or our new species (see the foregoing section on identification).

There has been further confusion about some of the type material of *Mixophyes*. Covacevich (1971) noted problems with the type material of *M. balbus* and *M. iteratus* supposedly lodged in the Queensland Museum by Dr Ian Straughan. According to Straughan (1968), there were two paratypes of *M. iteratus* lodged in the Queensland Museum. Covacevich found two specimens of *M. iteratus* in Straughan's collection, but one — QM J18851 from Lynch's Creek, Kyogle — did not agree with the given locality of 'Tweed River, Mount Warning'. The other (now registered as QM J45796) had no accompanying data. Straughan (*loc. cit.*) also said there were thirteen paratypes of *M. balbus* in the Australian and Queensland Museums. There are six in the Australian Museum (Cogger, 1979). Logically, there should be seven paratypes in the Queensland Museum. Covacevich (*loc. cit.*) found ten unregistered specimens in a jar labelled 'New England sp. nov. *M. balbus*'. These specimens are now registered as J45785-45794. We have examined them and found that three (J45785-7)

are *M. fasciolatus* and the other seven (J45788-94) are *M. balbus*. These seven specimens may be the missing seven paratypes and have been labelled 'probable types' in the collection.

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